TCEQ Interoffice Memorandum

To: File

Thru: Jeff Thomas, P.E., P.G., Team Lead, Dam Safety Section

From: Lisa Bishop, P.E. Robert Calderon, P.E.

Date: September 13, 2017

Subject: **TX00124 – Spring Lake Dam**
Montgomery County, Texas

TCEQ Dam Safety was notified by the owner that Spring Lake Dam sustained damages to the emergency spillway during the intense widespread rainfall from Hurricane/Tropical Storm Harvey. Hurricane Harvey made landfall on the Texas Gulf Coast on Friday, August 25, 2017 and produced heavy rains for 5 days with widespread flooding. The owner requested a site visit and assessment of the structure. Dam Safety staff visited the dam on September 13, 2017 to observe the dam and assess the storm damage.

TCEQ Staff was met at the dam by the following board members: John Johnson (President), Charley Stevens (Vice President), and Dan Smith (Secretary). They shared their eyewitness accounts of the events and their preventative actions.

The storm event, according to the owner's rain gauges, produced approximately 28-32 inches of rain over a 5-day period. Two days in advance of the storm, they began to lower the lake level approximately a foot with the use of siphons. During the storm, every 3-4 hours, they cleared debris from the brush guards of the drop inlet spillway. At peak flow, they observed up to 2 feet of water flowing into the principal spillway. The emergency spillway first engaged on Sunday and flows continued through Tuesday night. The downstream portion of the emergency spillway sustained heavy damage. They utilized their Emergency Action Plan, contacted TCEQ and contacted Ken Easterling, their engineer. Their engineer inspected the damage and will advise them on repairs.

The following observations of the storm damage were noted as shown in the attached photos.

- The downstream slope of the emergency spillway was severely damaged but the spillway did not fail. The headcutting erosion stopped before reaching the crest of the emergency spillway. The depth of cut measured approximately 11 feet. (Photos 1-3)
- The embankment soils at the emergency spillway appeared to be erosive sandy soil.
- Trees in the downstream channel were downed in the storm.
- The rubble riprap observed in the downstream channel was reportedly placed long before the storm – the riprap was not moved by the storm flows – the embankment upstream and to the right of the riprap was heavily eroded. (Photos 4 & 5)

- The debris line suggested the emergency spillway was engaged with approximately 1 foot of flow. (Photo 6 & 7)
- The emergency spillway was undamaged on the upstream slope and crest. This distance was measured by pacing to approximately 45 feet from normal reservoir pool level to the beginning of erosion cut. (Photo 8)
- The debris line was observed at approximately 3 feet below the top of the dam. (Photo 9)
- As a conservative safety measure, the owners lowered the lake level 18" below normal pool with the use of pvc siphons. (Photo 10)
- Some damage was observed on the ends of the primary spillway outfall pipes. Two 48" CMP with some concrete across the tops were observed. The outfall pipes were reportedly submerged during the storm and water shot up forcefully at the outfall. (Photo 11)
- Some bare spots were observed on the crest. POA noted that they plan to address this by adding top soil and seed. (Photo 12)

Based on the eyewitness accounts and the inspection observations, the severe damage to the emergency spillway downstream slope began at a steep dropoff of the channel near the riprap. The headcutting erosion worked its way back toward the crest.

Follow-up Action

Any repair or modification plans for the dam need to be submitted to TCEQ Dam Safety for review and approval prior to beginning construction.

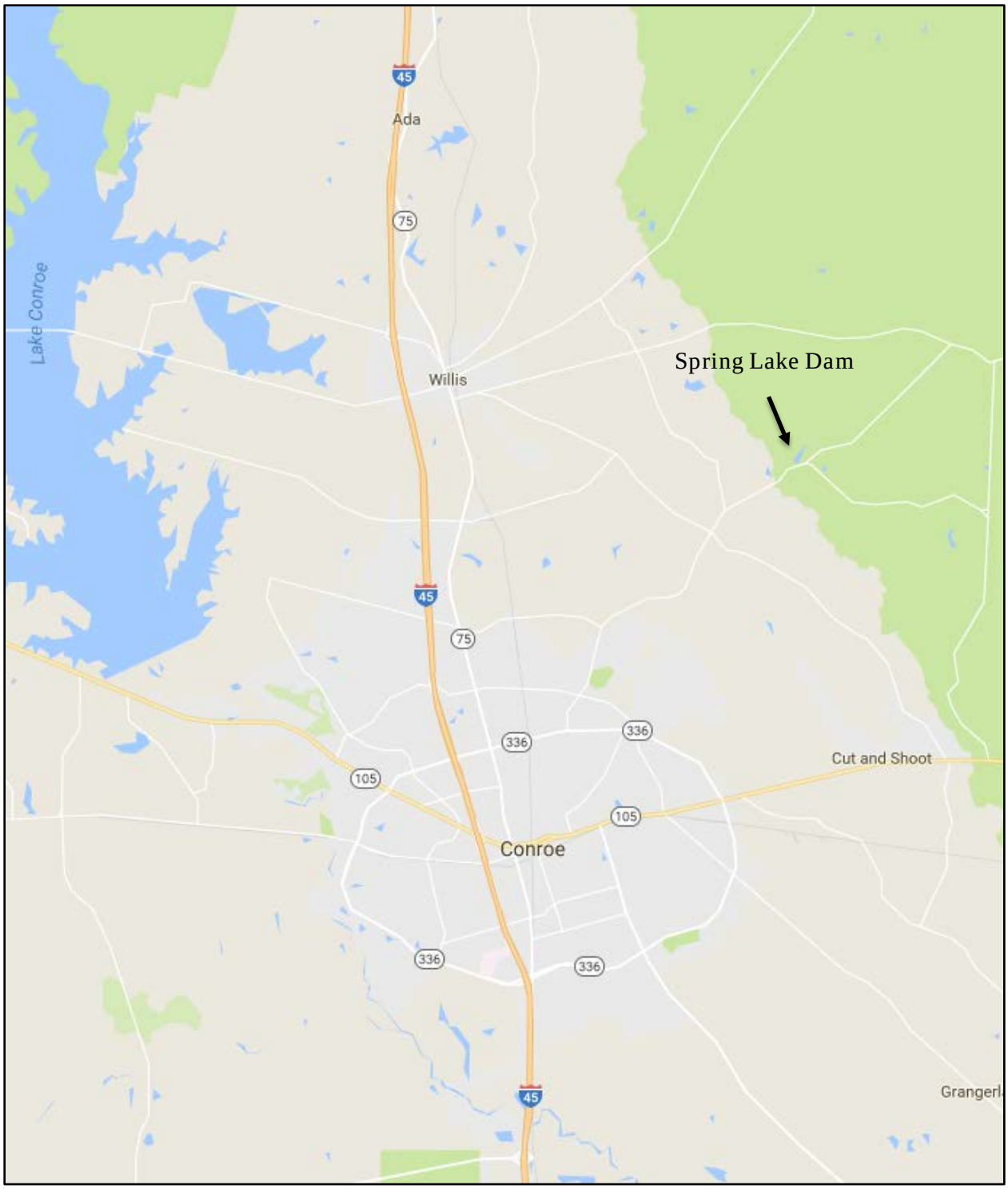

Figure 1: Vicinity map

Figure 2: Aerial photo of the dam with photo locations

Photo 1: Downstream slope of the emergency spillway looking upstream toward the reservoir – severely damaged. Note safety tape.

Photo 2: Downstream slope of the emergency spillway - the depth of cut measured approximately 11 feet.

Photo 3: Erosion cut on the downstream slope of the emergency spillway, as viewed from the crest of the spillway.

Photo 4: Rubble riprap was placed as shown in the photo long before the storm – the riprap was not moved by the storm flows – the embankment upstream and to the right of the riprap was soured away.

Photo 5: Close-up view of the rubble riprap.

Photo 6: Emergency spillway – note debris line.

Photo 7: Debris line to the left of the emergency spillway.

Photo 8: Emergency Spillway as viewed from reservoir water line – the downstream erosion cut left approximately 45 feet of the spillway intact.

Photo 9: Upstream slope – the debris line was observed at approximately 3 feet below the top of the dam.

Photo 10: Primary spillway inlets. Pvc siphon pipes were used to lower the lake level to 18 inches below normal pool

Photo 11: Primary spillway outlets pipes incurred minor damage to the ends of the CMP. The outfall pipes were reportedly submerged during the storm and water shot up forcefully at the outfall.

Photo 12: Crest of the dam – the POA noted that they plan to address the bare spots by adding top soil and seed.